

Monitoring Changes in Corn Flea Beetle Populations, 1999 to 2002

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Introduction

Stewart's disease of corn, caused by the bacterium *Pantoea (Erwinia) stewartii*, is an extremely important disease for seed and sweet corn producers. Economic losses can be substantial for both producers. In the seed corn industry, zero tolerance phytosanitary regulations greatly limit the ability of seed corn to be exported from fields where Stewart's disease has been found. One area of research that has been limited in regard to Stewart's disease is the population dynamics of the corn flea beetle (*Chaetocnema pulicaria*) vector. The corn flea beetle is the primary mode for acquiring and transmitting *P. stewartii*, as well as the sole overwintering habitat for the bacterium. More information is needed on the corn flea beetle to help improve management tactics for reducing the risk of Stewart's disease.

Materials and Methods

Beginning in 1999, we have monitored corn flea beetle populations weekly using sweep nets. To monitor the corn flea beetle populations, 10 replications of 10 sweeps/replication were taken over a linear, 6-m (20 ft) strip of either grass borders or cornfields. These samples were then taken back to the epidemiology lab where corn flea beetles were separated from other insects and plant debris and counted. The average number of corn flea beetles/10 sweeps was calculated and plotted against time to determine when corn flea beetle generations occurred.

During this same period, we monitored the growing degree-days to determine the timing of the corn flea beetle generations. Using a base 16°C (60.8°F) temperature scale, the

accumulated number of degree-days from January 1 each year has been calculated and related to the timing of the corn flea beetle generations.

Results and Discussion

No corn flea beetles were detected in 1999 until approximately July 14 (Degree Days (DD) = 318). Corn flea beetle populations, however, never exceeded one/10 sweeps (Figure 1). In 2000, overwintering corn flea beetles were first observed on April 25 (DD = 49), with populations peaking on May 11 (six/10 sweeps and DD = 112). The highest observed number of corn flea beetles in the cornfield was 15 per 10 sweeps on July 25 (DD = 492). In 2001, a colder winter greatly reduced the survival of the corn flea beetle population. Corn flea beetles were not found until May 16 (DD = 54). Throughout the year, corn flea beetle populations never exceeded one corn flea beetle/10 sweeps. The corn flea beetle population slowly rebounded by July 2002, and the number of corn flea beetles at that time was between 2.5 and 3 per 10 sweeps (DD = ~ 375).

The implication of this research is that corn flea beetle populations at Sutherland are greatly dependent on the winter temperatures, which determine their potential survival. Validation of a predictive degree-day program may help to determine if and when corn flea beetle populations will be high in a given year and whether or not seed and/or foliar insecticides will be recommended.

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